

CLAIMS

What is claimed is:

1. A well perforating device comprising a tubular body member having a plurality of inwardly shaped hole penetration areas of reduced thickness formed on the outer surface thereof, and a plurality of perforating charges positioned within said body member, each of said perforating charges containing a hollow cone shaped explosive charge aligned with one of said hole penetration areas so that upon detonation of the hollow cone shaped charge said body member is penetrated through said aligned hole penetration areas, an improvement comprising; an arched geometric shape in said inwardly shaped hole penetration areas which provides additional strength to said tubular body member so that the thickness of said body member at the location of said inwardly shaped hole penetration can be further reduced minimizing the resistance to said perforating charges while still retaining sufficient structural strength to withstand pressures exerted on said body member.
2. The perforating device of claim 1 wherein said plurality of inwardly shaped hole penetration areas have an elliptical shape.
3. The perforating device of claim 1 wherein said plurality of inwardly shaped hole penetration areas have a radius shape.
4. The perforating device of claim 3 wherein said plurality of inwardly shaped hole penetration areas are made longer longitudinally so that said hole penetration areas have an elliptical shape.
5. The perforating device of claim 1 wherein said plurality of inwardly shaped hole penetration areas have a radius shape with a longitudinal flat area where the thickness of said body member is reduced the most.

6. The perforating device of claim **5** wherein said longitudinal flat area makes said plurality of inwardly shaped hole penetration areas to have an elliptical shape.
7. The perforating device of claim **1** wherein said plurality of inwardly shaped hole penetration areas has an industry standard elliptical shape with an additional longitudinal arched shape so that a flat area is formed at the center of said hole penetration area where the thickness of said body member is reduced the most.
8. A well perforating devise comprising a tubular body member having at least one hole penetration area of reduced thickness formed in the outer surface thereof, and a perforating charge positioned within said body member, said perforating charge containing a hollow cone shaped explosive charge aligned with one of said hole penetration areas so that upon detonation of the hollow cone shaped charge said body member is penetrated through said aligned hole penetration area, an improvement comprising:
an arched geometric shape for said hole penetration area of reduced thickness as a means to provide additional structural strength to further reduce the thickness while retaining sufficient strength to withstand pressures exerted on said body member.
9. The perforating device of claim **8** wherein said hole penetration area has an elliptical shape.
10. The perforating device of claim **8** wherein said hole penetration area has a radius shape.
11. The perforating device of claim **10** wherein said hole penetration area is made longer longitudinally so that said hole penetration area has an elliptical shape.
12. The perforating device of claim **8** wherein said hole penetration area has a radius shape with a longitudinal flat area where the thickness of said body member is reduced the most.

13. The perforating device of claim **12** wherein said longitudinal flat area makes said hole penetration area to have an elliptical shape.

14. The perforating device of claim **8** wherein said hole penetration has an industry standard elliptical shape with an additional longitudinal arched shape so that a flat area is formed at the center of said hole penetration area where the thickness of said body member is reduced the most.